

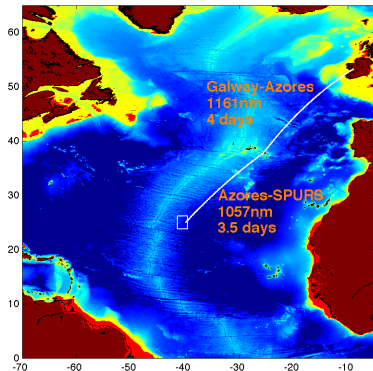
# Upper Ocean Microstructure and Air-Sea Fluxes

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# Shiptime for SPURS



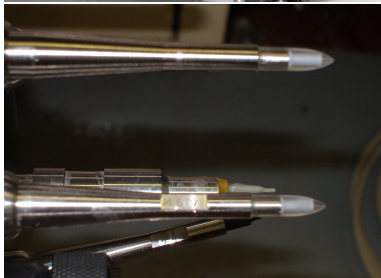
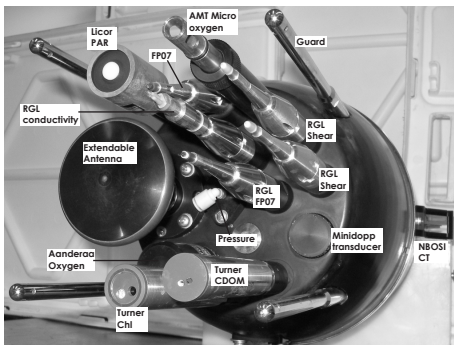
- An pre-application for ship time for the R/V Celtic Explorer has been submitted
- Next call for ship time is October 2011
- SMOSPROC: ESA-funded post-doc starting March 01 with salinity/microstructure as the focus
- ASIP-funded project with Norwegian MET.NO - waves/turbulence
- PI Proposal pending with Science Foundation Ireland
- PhD Fellowship proposal pending with Canadian Research Council

# Air-Sea Interaction Profiler (ASIP)



- By profiling vertically towards the air-sea interface, ASIP provides detailed measurements of the undisturbed water
- Features
  - Positively buoyant instrument submerged with a thruster
  - Measurements made during ascent only
  - Maximum depth 100m
  - Onboard power 1000 Whr from Li-ion batteries
  - GPS receiver to determine position
  - Iridium modem for transmitting position and mission parameters

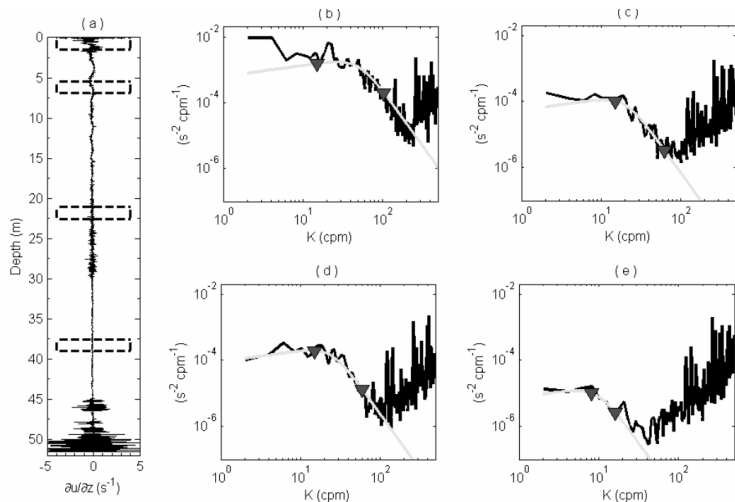




- Shear (turbulence)
- 1-D doppler
- Microstructure temperature
- Microstructure conductivity
- Slow temperature & conductivity
- Oxygen
- PAR
- Pressure
- Adding a hydrophone for a cruise in Norway in April

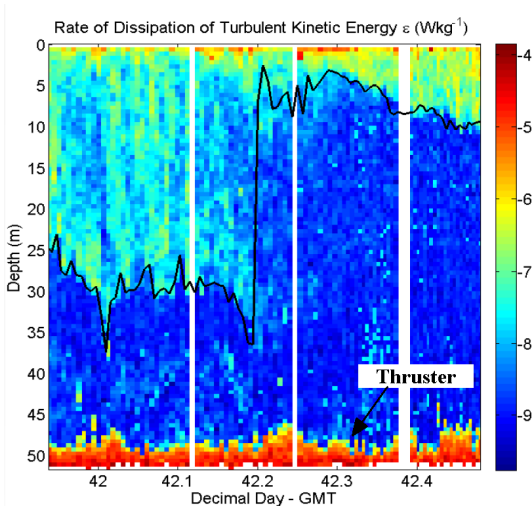


# ASIP Profile



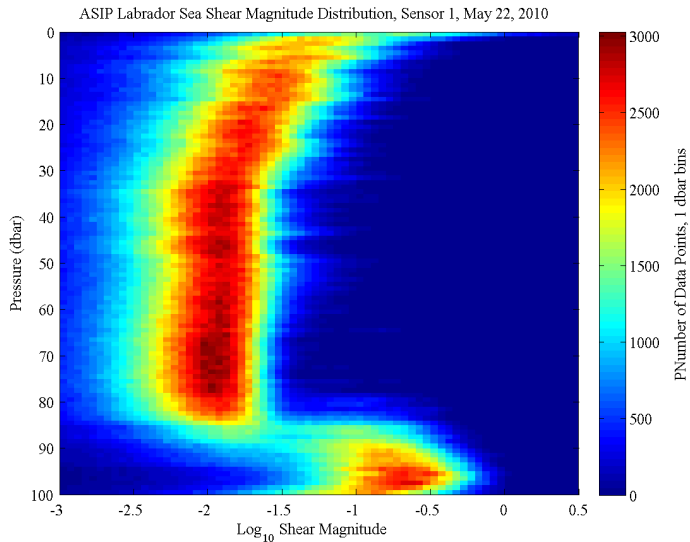
- ASIP shear spectra closely follow the Nasmyth Spectrum expected for isotropic turbulence

# Indian Ocean: Turbulent dissipation

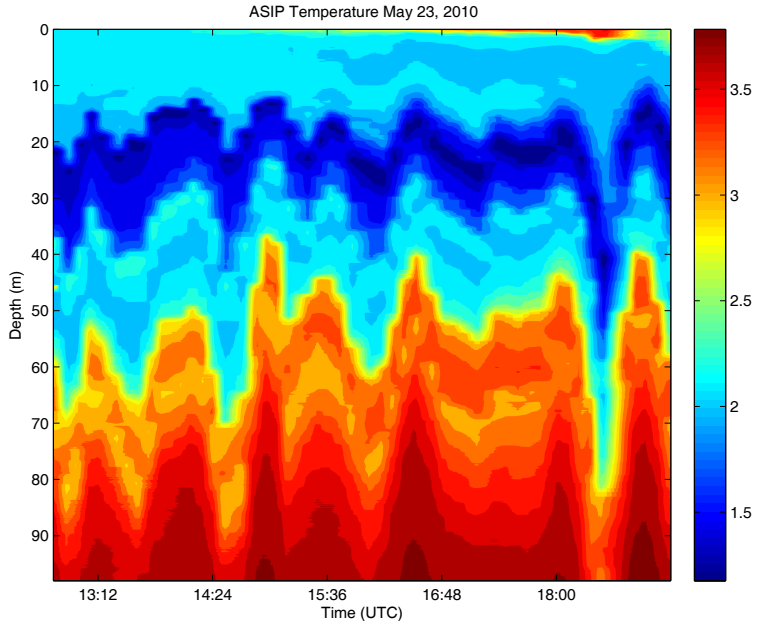


- The black line represents the mixing layer depth ( $D$ ) which represents the depth of active mixing
- Dramatic change in  $D$  with increased buoyancy flux
- Dissipation under these conditions scales with law of the wall (wind 2-6  $\text{ms}^{-1}$ )

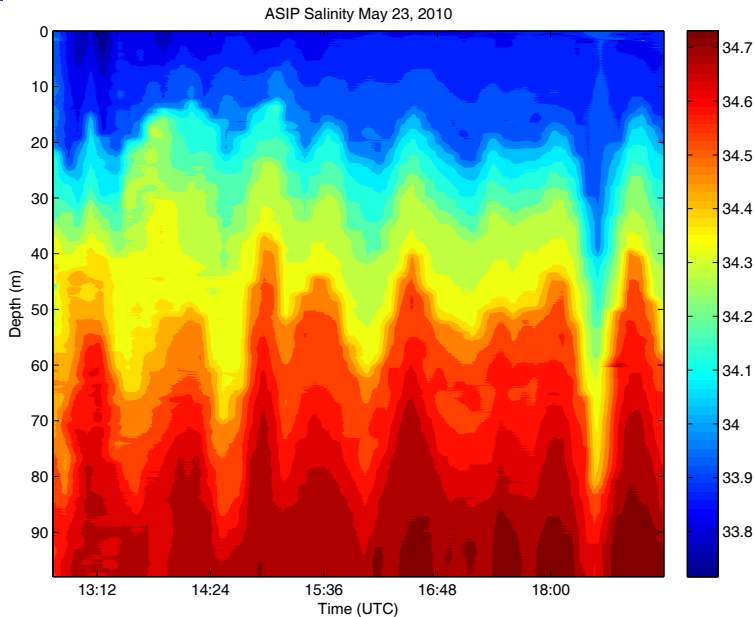
# Shear Distribution



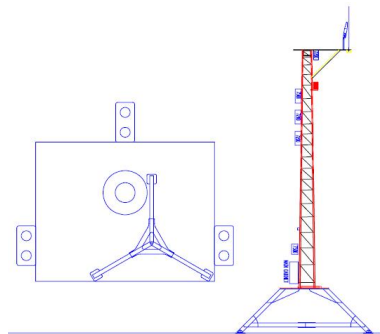
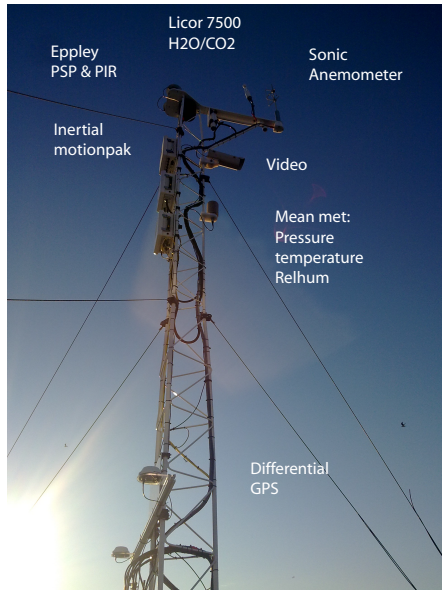
# Temperature Labrador Sea : Low winds ( $<5 \text{ ms}^{-1}$ )



# Salinity Labrador Sea : Low winds ( $<5 \text{ ms}^{-1}$ )



# Shipboard Flux Mast



- Air-sea heat and H2O fluxes  
i.e. eddy covariance
- Tripod base allows ease of installation

# Sailbuoy: Christen Michelsen Research (cmr.no)



- Payload: 10 kg / 60 dm<sup>3</sup>
- Average speed: 1-2 knots
- Navigable wind speed range: 2-20 ms<sup>-1</sup>
- [http://www.youtube.com/watch?v=K\\_3vZDbQQI](http://www.youtube.com/watch?v=K_3vZDbQQI)